

# Looking Up at the Sky with NOAA

Name: \_\_\_\_\_

Activity Workbook



# Vocabulary

<b>Atmosphere</b>	The air or layer of gases surrounding the Earth.
<b>Bolt</b>	The electrical charge from the cloud.
<b>Clouds</b>	Visible water drops in the sky.
<b>Flood</b>	A lot of water overflowing dry land.
<b>Forecast</b>	A prediction of a weather condition.
<b>Front</b>	A boundary between two air masses of different temperature.
<b>GOES</b>	Geostationary Operational Environmental Satellites: used for short-range warning.
<b>Hail</b>	The frozen drops of water that fall from the sky.
<b>Lightning</b>	A flash of light coming from the clouds.
<b>Meteorologist</b>	A scientist trained in weather and climate conditions.
<b>NOAA</b>	National Oceanic and Atmospheric Administration: a scientific agency that provides information and data about life on Earth, our oceans, atmosphere, and living marine resources.
<b>POES</b>	Polar-orbiting Operational Environmental Satellites: used for global long-range forecasting.
<b>Precipitation</b>	The falling of rain, mist, hail, sleet, or snow, on the Earth.
<b>Rain</b>	Small drops of water falling from the sky.
<b>Rainbow</b>	An array of colors that is formed in the sky opposite the sun.
<b>Rain Shower</b>	Large amounts of rain falling for a long time.
<b>Satellites</b>	Machines that orbit the Earth with electronic eyes.
<b>Thunder</b>	The sound that usually follows a flash of lightning.
<b>Thunderstorms</b>	Heavy showers that have thunder, hail, and lightning.
<b>Tornado</b>	A strong rotating column of air in contact with the ground.
<b>Vapor</b>	Liquid that turns into a gas.
<b>Water Cycle</b>	The process that creates clouds.

# Looking Up at the Sky with NOAA

## Table of Contents

<b>Rain</b>	<b>1</b>
<b>The Water Cycle</b>	<b>2</b>
<b>Activities</b>	<b>3</b>
<b>Clouds</b>	<b>5</b>
<b>Activities</b>	<b>10</b>
<b>Thunderstorms &amp; Lightning</b>	<b>11</b>
<b>Satellites</b>	<b>12</b>
<b>Activities</b>	<b>15</b>
<b>Educational Resources</b>	<b>23</b>

### Workbook Acknowledgements:

Created by: Nina Jackson & Nicole Clark

Layout & Artistic Design: Marc Pulliam

Technical Editors: Tara Mairs, Mindy Gaines, Ryan Quick, Paula Goddard

# Rain

## About Our Organization

The National Oceanic and Atmospheric Administration (NOAA) is a scientific agency that provides information and data about life on Earth and our oceans, atmosphere, and living marine resources. NOAA programs include sanctuaries, environmental satellites, global climate change, and ocean exploration initiatives, to climate, weather, and water services.

NOAA has many different branches that each contribute to its mission, for example, the NOAA Satellite and Information Service (NESDIS). NESDIS is dedicated to providing timely access to global environmental data from satellites and other sources to promote, protect, and enhance the Nation's economy, security, environment, and quality of life. To fulfill its responsibilities, NESDIS does the following:

- acquires and manages the Nation's operational environmental satellites;
- operates the NOAA National Data Centers;
- provides data and information services including Earth system monitoring;
- performs official assessments of the environment; and
- conducts related research.



## What is Rain and How Does it Form?

Rain is small cool drops of water falling from the sky. The falling of rain, mist, hail, sleet, or snow, on the Earth is called precipitation. A rain shower is large amounts of rain falling for a long time, producing a lot of water. These showers can become thunderstorms. Thunderstorms are heavy showers that have lightning, thunder, and sometimes hail. Lightning is a flash of light, or electrical discharge, coming from the clouds. This electrical discharge happens in the atmosphere. Thunder is the sound that usually follows a flash of lightning. Hail is the frozen drops of water that fall from the sky. The atmosphere is the air or layer of gases surrounding the Earth. When land cannot hold all the water that falls during a rain shower or storm, a flood can occur. A flood is a lot of water overflowing dry land. Floods can usually be divided into two categories: flash flooding and river flooding. Flash floods are usually caused by slow-moving thunderstorms or two or more thunderstorms that move over the same area one after the other. Flash floods usually occur within six hours of heavy rainfall and are usually more life threatening than river floods, according to NOAA's National Weather Service.

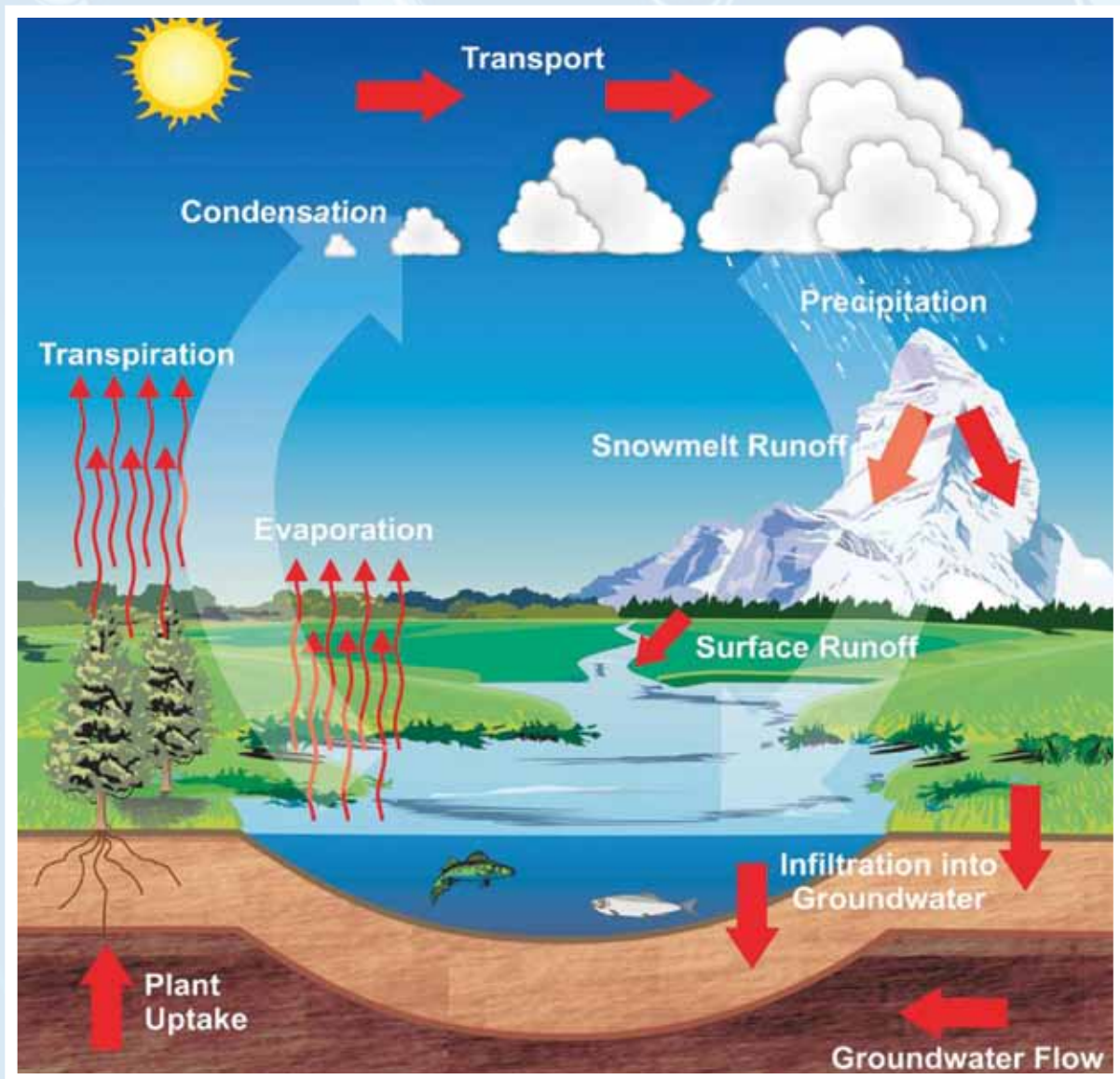
If you look up into the sky right after a thunderstorm, you might see a rainbow. A rainbow is an array of colors that is formed in the sky opposite the sun. Sometimes if you look toward the falling rain drops while it's raining you can see a rainbow.



To know how rain is developed, you must understand the water cycle. Water is always in the atmosphere because the Earth has a lot of water sources like lakes, streams, rivers, and oceans. The sun and the water play a major role in the water cycle.

## How the water cycle works

The liquid water is warmed by the Sun, it turns into a gas called vapor and rises into the atmosphere. When the temperature of the atmosphere cools, the vapor forms clouds. Clouds are visible water drops in the sky. When water falls from the clouds the water drops are called rain, snow, or hail. The falling of rain, mist, hail, sleet, or snow, on the Earth is called precipitation.



To find out more information about the Earth's water cycle visit:  
[http://science-edu.larc.nasa.gov/cloud\\_chart/](http://science-edu.larc.nasa.gov/cloud_chart/)

# Activity Page

## 1. Let's Dress for the Weather

Circle the items that would prepare you for rainy weather:

Sunglasses

Rain Coat

Scarf

Umbrella

Dress

Sandals

Book Bag

Watch

Rubber Boots

Gloves

Rain Hat

Crayons

## 2. Create Your Own Rainbow Mobile

Materials needed:

- Paper
- Crayons: Red, Orange, Yellow, Green, Blue, and Purple
- Scissors
- Yarn
- Hanger
- Hole Puncher
- Cotton Balls
- Glue

Directions:

- 1.) Draw a rainbow with 6 sections and color the rainbow.
- 2.) Draw clouds on the end of each side of the rainbow.
- 3.) Cut out the rainbow and paste the cotton balls to the clouds.
- 4.) Hole punch the top of the rainbow and attach a piece of yarn.
- 5.) Tie the yarn around the bottom of the hanger to create a rainbow mobile.

Make your project stand out by creating other weather objects to go on the rainbow mobile.  
(Examples: clouds, stars, the moon, and the sun).

### 3. Create Your Own Flood Warning Poster

Use the information and pictures found at this link: [www.srh.weather.gov/tadd/](http://www.srh.weather.gov/tadd/) to create your own flood warning poster.



### 4. Fill in the Blank

Fill in the blank with the correct word. Use the following words:

streams      bridges      ground      flash flood      roads      car

1. A flash flood can wash out \_\_\_\_\_ and bridges.
2. A \_\_\_\_\_ may come to you as a high wave of water.
3. If it is raining hard, water cannot sink into the \_\_\_\_\_.
4. Flash floods most often occur in mountain \_\_\_\_\_.
5. If you are driving in deep water, get out of your \_\_\_\_\_ and climb to higher ground.
6. If you are driving in heavy rain, watch for flooding at \_\_\_\_\_ and low points in the road.



# Clouds

## Who Is Watching The Clouds?

Meteorologists are forecasters or research scientists trained in analyzing and observing weather. They observe clouds, analyze other weather information from around the globe, and prepare forecasts. A forecast is a prediction of what the weather will be. Meteorologists study physics, atmospheric science, satellites, computer science, climatology, and chemistry. Go to the following web site to learn more about meteorology as a career: [www.ametsoc.org](http://www.ametsoc.org). Now, let's read about clouds.





## What Are The Types of Clouds?

The types of clouds are high, middle, and low. The high clouds are 20,000 feet above the Earth.



### **Cirrus Clouds**

These are the highest clouds. They usually mean fair weather, and they look white and feathery.



### **Cirrocumulus Clouds**

These are patches or sheets of very small elements in the form of grains or ripples, never showing shading.



### **Cirrostratus Clouds**

These are widespread layers of veil-like ice crystal clouds. Cirrostratus clouds can be very thin, allowing plenty of sunshine through, or thousands of feet thick obscuring the sun and/or moon.

The bottom of the middle clouds are 6,500 to 20,000 feet above the Earth. Middle clouds are:



### **Altostratus Clouds**

These clouds cover the whole sky and have a gray or blue-gray appearance. An altostratus cloud usually forms ahead of storms with continuous rain or snow. Sometimes, rain will fall from an Altostratus cloud.



### **Nimbostratus Clouds**

A widespread thick layer of cloud with poorly defined edges. These clouds tend to produce steady rain.



### **Altocumulus Clouds**

Puffy and usually white or gray; they often occur in sheets or patches with wavy, rounded masses or rolls. Altocumulus clouds often are seen preceding a cold front, and their presence on a warm, humid, summer morning frequently signals the development of thunderstorms later in the day.

The low clouds are below 6,500 feet above the Earth.



### **Stratus Clouds**

Low gray blankets of clouds, that cover the entire sky. These clouds usually form before snow or rain.



### **Cumulus Clouds**

Small heaps of widely scattered clouds with flat bottoms and rounded tops. The individual cloud elements are usually short lived and dissipate quickly with the loss of daytime heat.



### **Cumulonimbus Clouds**

These clouds are tall, dense, and involved in thunderstorms and other intense weather.



## **Did you know...**

A tornado is a violent, dangerous, rotating column of air that is in contact with both the surface of the Earth and a Cumulonimbus cloud or, in rare cases, the base of a Cumulus cloud. Tornadoes come in many shapes and sizes, but are typically in the form of a visible condensation funnel, whose narrow end touches the Earth and is often encircled by a cloud of debris and dust. Most tornadoes have wind speeds between 40 mph and 110 mph, are approximately 250 feet across, and travel a few miles before dissipating.

## **Want to know more?**

Visit: [www.nssl.noaa.gov/edu/safety/tornadoguide.html](http://www.nssl.noaa.gov/edu/safety/tornadoguide.html) for more information on how tornadoes are formed, the damage they cause, and safety during these violent storms.

# Activities...

## 1. Tornado Quiz

Circle T (true) or F (false) for each sentence below.

- |   |   |     |   |
|---|---|-----|---|
| T | F | 1.  | A tornado looks like a funnel with the wide part at the top.  |
| T | F | 2.  | You will always notice a funnel before a tornado strikes.   |
| T | F | 3.  | A tornado can destroy everything in its path.   |
| T | F | 4.  | Tornadoes have wind speeds between 40 mph and 110 mph.  |
| T | F | 5.  | A tornado can throw cars and trucks into the air.   |
| T | F | 6.  | There is a lot of sunshine during a tornado.  |
| T | F | 7.  | Go into a large room such as a school cafeteria if there is a tornado warning.                          |
| T | F | 8.  | The sky may be blue at the time you hear a tornado watch.   |
| T | F | 9.  | When a tornado is coming, seek shelter immediately.   |
| T | F | 10. | When you hear a tornado warning, get in the car and drive as fast as you can in the opposite direction. |

## 2. Word Association

Circle the words below that relate to tornadoes.

Column	Waves	Safety	Windy
Sun	Funnel	Destructive	Gray
Twister	Cloudy	Snow	Fast

## What Are Thunderstorms?

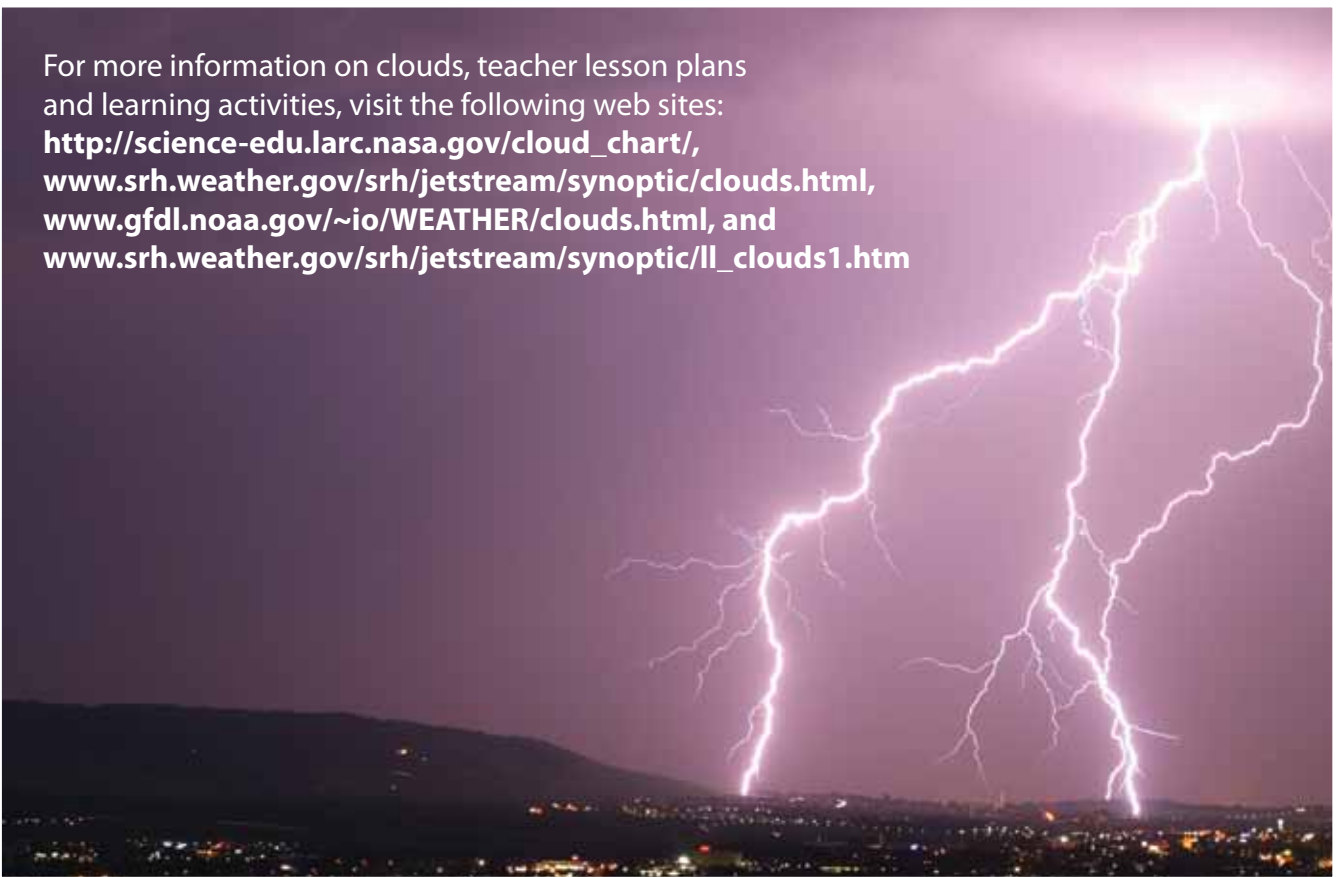
A thunderstorm is one type of severe storm. Strong winds, heavy and steady rain, lightning, and flooding can occur during a thunderstorm. When a cold front pushes the air up into the clouds or the clouds keep growing up because of the heat from the ground, a thunderstorm is created. A front is a boundary between two air masses of different temperature.

Thunderstorms can cause millions of dollars in damages and can affect thousands of people; some may even need to be evacuated from their homes. To learn more about disasters go to: [www.ncdc.noaa.gov/oa/climate/severeweather/extremes.html](http://www.ncdc.noaa.gov/oa/climate/severeweather/extremes.html). Some thunderstorms can develop into tornados. To learn more about thunderstorms, hail, flood, and severe weather, go to [www.nssl.noaa.gov](http://www.nssl.noaa.gov).

## What is Lightning?

Lightning occurs when an electrical charge develops within the clouds. When the electrical charge comes out of the clouds, it is known as a lightning bolt. The bolts vary in shape and size. If you are outside and you see lightning, stay away from trees, water and poles because they attract lightning. Seek shelter inside immediately. For more information on lightning safety and lightning activities, go to: [www.nws.noaa.gov/om/reachout/thunderstorm.shtml](http://www.nws.noaa.gov/om/reachout/thunderstorm.shtml).

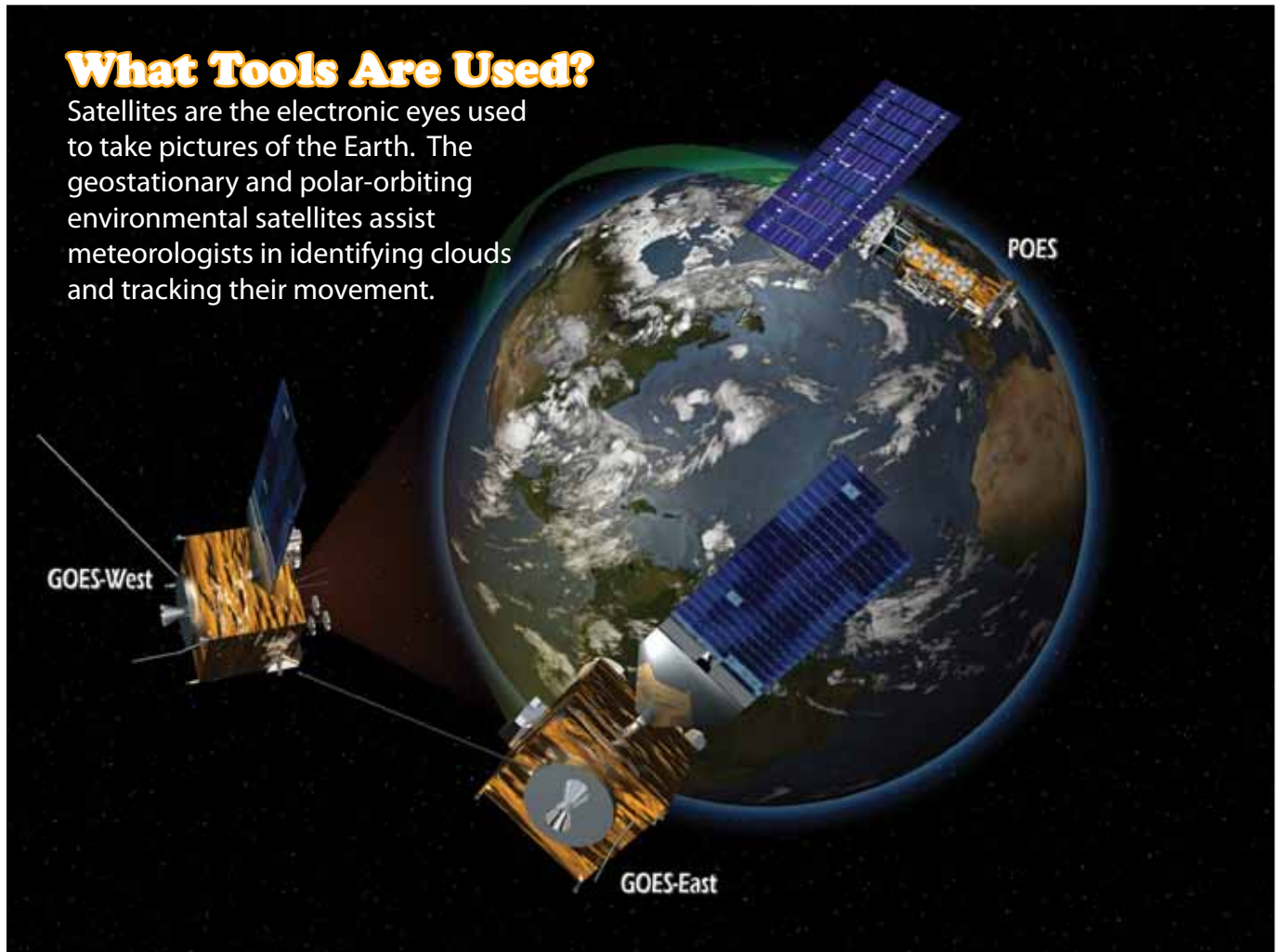
For more information on clouds, teacher lesson plans and learning activities, visit the following web sites:  
[http://science-edu.larc.nasa.gov/cloud\\_chart/](http://science-edu.larc.nasa.gov/cloud_chart/),  
[www.srh.weather.gov/srh/jetstream/synoptic/clouds.html](http://www.srh.weather.gov/srh/jetstream/synoptic/clouds.html),  
[www.gfdl.noaa.gov/~io/WEATHER/clouds.html](http://www.gfdl.noaa.gov/~io/WEATHER/clouds.html), and  
[www.srh.weather.gov/srh/jetstream/synoptic/ll\\_clouds1.htm](http://www.srh.weather.gov/srh/jetstream/synoptic/ll_clouds1.htm)





## What Tools Are Used?

Satellites are the electronic eyes used to take pictures of the Earth. The geostationary and polar-orbiting environmental satellites assist meteorologists in identifying clouds and tracking their movement.



Environmental satellites are key tools in forecasting weather, analyzing climate, and monitoring hazards worldwide. NESDIS operates two types of environmental satellites, which are:

### **Geostationary Operational Environmental Satellites (GOES)**

These types of satellites support short-range weather forecasts and warnings. They are positioned over the Equator at approximately 22,300 miles above Earth. The images are used to monitor severe weather conditions.

### **Polar-orbiting Operational Environmental Satellites (POES)**

These types of satellites support global long-range forecasting; positioned in North – South orbits at 500 miles above Earth; taking images of the entire planet every six hours.

For more information on GOES and POES spacecraft, visit:

[www.nesdis.noaa.gov/SatProducts.html](http://www.nesdis.noaa.gov/SatProducts.html).

## Ten Facts About NOAA Satellites

1. NOAA operates the Search & Rescue Satellite Aided Tracking System (SARSAT) to locate people in distress almost anywhere in the world at anytime and in most conditions. For more information on search and rescue, visit: [www.sarsat.noaa.gov](http://www.sarsat.noaa.gov).
2. NOAA satellites have helped to rescue more than 20,000 people since 1982.
3. NOAA's satellites can show the location of hurricanes, fire, snow cover, thunderstorms, and erupting volcanoes anywhere on the Earth.
4. NOAA's satellites allow scientists and researchers to watch the lights go on all over the world as the sun sets.
5. Satellites are a reliable source of communication since they are above the Earth's atmosphere.
6. Before satellites were invented, information was bounced off radio towers to Earth. However, since the atmosphere is always changing, the signals would not always travel to the person or place intended.
7. Geostationary satellites are about 22,300 miles above the equator.
8. Geostationary satellites travel at a speed that matches the Earth's rotation (6800 miles per hour).
9. Polar-orbiting satellites circle the Earth 14 times a day and pass almost directly over the North and South Poles. They also view all the regions of the Earth in a single day.
10. Geostationary satellites view the western Hemisphere and polar-orbiting satellites view the poles and the entire Earth.



## Snow Cover in the U.S.



## Hurricane Katrina



## 1. Word Identification

Put the letter on the line that identifies the correct word.

____ Rain	a	Large amount of rain falling for a long time.
____ Precipitation	b	A scientific agency.
____ Stratus	c	The process that creates clouds.
____ Cumulus	d	Flashes of light coming from the clouds.
____ Thunderstorm	e	A scientists trained in weather and climate conditions.
____ Lightning	f	The sound that usually follows a flash of lightning.
____ Front	g	A prediction of a weather condition.
____ Thunderbolt	h	An array of colors that is formed in the sky.
____ Global	i	Lots of rain drops.
____ Atmosphere	j	Visible water drops in the sky.
____ Rainbow	k	Clouds that form prior to rain or snow.
____ Water cycle	l	Air or layer of gases surrounding the Earth.
____ NOAA	m	Machines that orbit the Earth with electronic eyes.
____ Cirrus	n	Liquid that turns into a gas.
____ Satellite	o	Clouds that remind you of cotton balls.
____ Meteorologist	p	Heavy showers that have thunder, hail, and lightning.
____ Forecast	q	A strong rotating column of air.
____ Rain Shower	r	Thin clouds that look like strands of hair.
____ Vapor	s	A lot of water overflowing dry land.
____ Thunder	t	Electrical charge coming from the clouds with thunder.
____ Tornado	u	Frozen drops of water that fall from the sky.
____ Flood	v	Small drops of water that fall from the sky.
____ Clouds	w	The boundary between two air masses.
____ Hail	x	The entire Earth.

## 2. Word Search

Find the words listed below. The letters that you do not circle will spell out the topic of this word search.

Air  
Barometer  
Blizzard  
Celsius  
Chill  
Cirrus  
Cloud  
Cold  
Cumulus  
Cyclone  
Degree  
Dew  
Drizzle  
Fahrenheit  
Forecast  
Hail  
Heat  
Humidity  
Hurricane  
Lightning  
Meteorology  
Precipitation  
Pressure  
Rain  
Snow  
Stratus  
Temperature  
Thermometer  
Thunder  
Tornado

P	W	G	M	E	T	E	O	R	O	L	O	G	Y	T
E	R	A	N	D	S	C	L	B	H	E	T	E	F	H
B	H	E	L	I	I	U	L	L	R	E	N	E	O	E
A	C	O	C	R	N	I	I	U	I	A	A	C	R	R
R	C	Y	R	I	Z	T	T	S	C	H	U	T	E	M
O	D	U	C	Z	P	A	H	I	L	M	C	S	C	O
M	S	U	A	L	R	I	R	G	U	E	L	T	A	M
E	W	R	O	E	O	R	T	L	I	I	C	R	S	E
T	D	E	P	L	U	N	U	A	A	L	R	A	T	T
E	A	M	D	H	C	S	E	H	T	N	D	T	R	E
R	E	D	R	I	Z	Z	L	E	A	I	R	U	A	R
T	T	I	E	H	N	E	R	H	A	F	O	S	I	R
S	N	O	W	H	U	M	I	D	I	T	Y	N	N	A
I	P	R	E	S	S	U	R	E	E	E	R	G	E	D
N	R	E	D	N	U	H	T	O	D	A	N	R	O	T

A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N  
O  
P  
Q  
R  
S  
T  
U  
V  
W  
X  
Y  
Z



**What's the topic?**

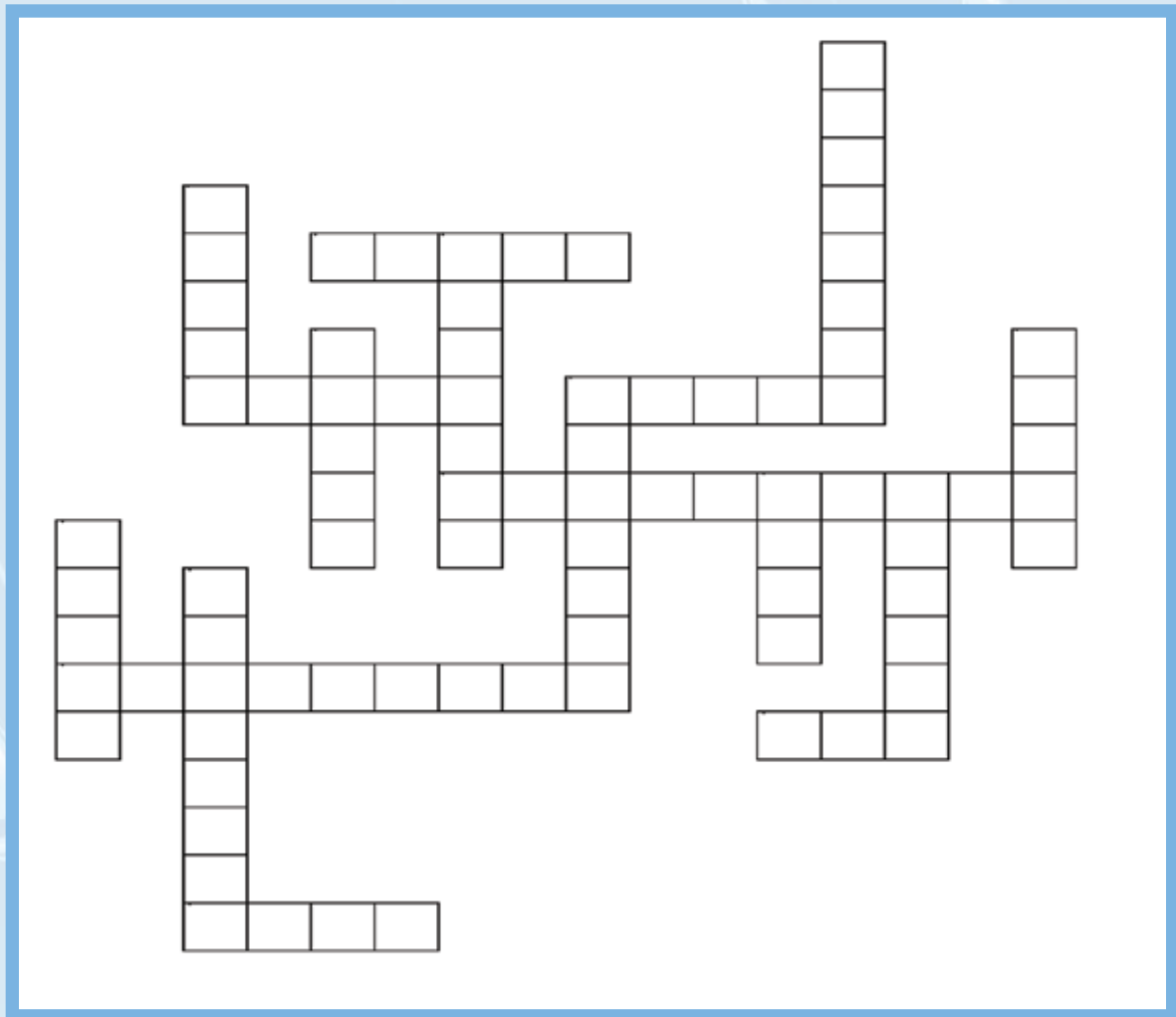
**W** \_\_\_\_\_

\_\_\_\_\_

**R** \_\_\_\_\_

### 3. Word Search

Fill in the boxes with the correct words.



#### DOWN

Boundary  
Sound  
Twister  
Foggy  
World  
Predict  
Rain  
Colors  
Flash  
Hairlike

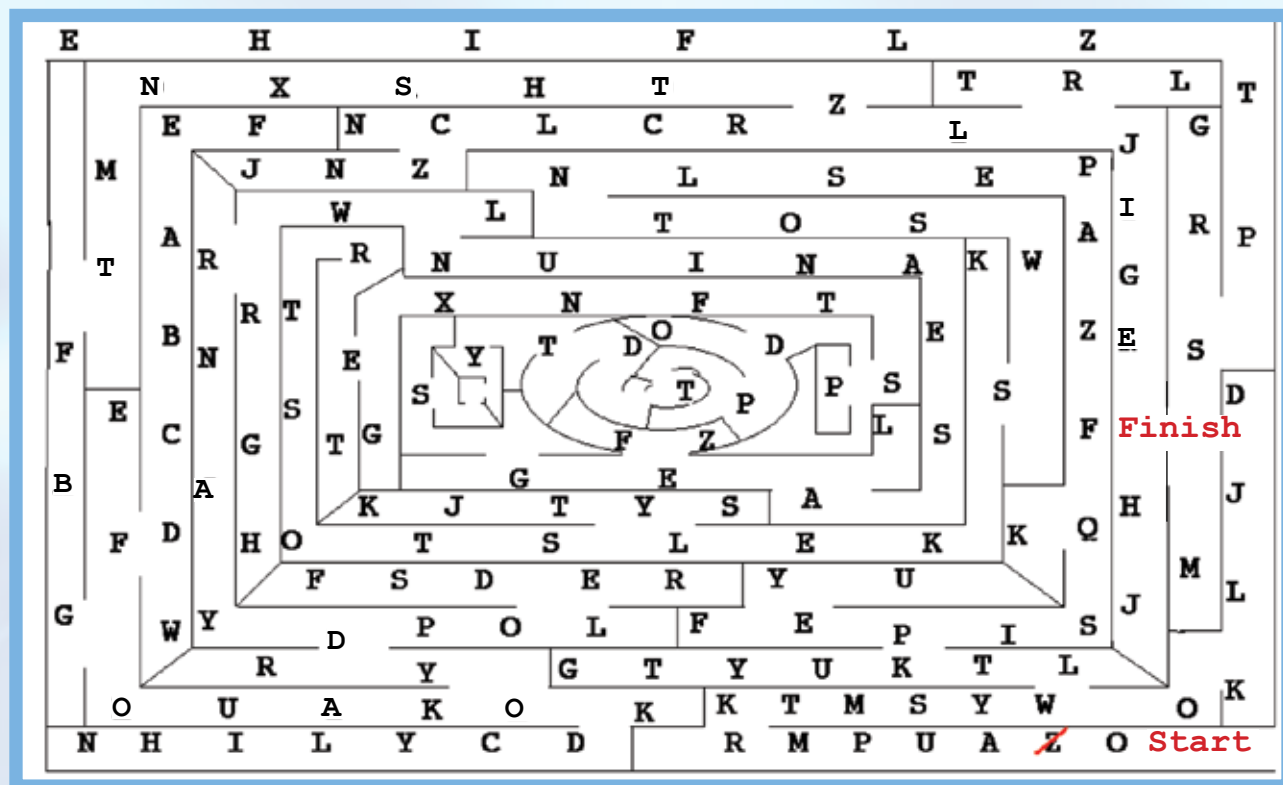
#### ACROSS

Water  
Drops  
Puffy  
Electrical  
Scientist  
Gas  
Eyes



## 4. Word Maze

As you travel along cross out every other letter. Using the remaining letters in the maze, insert them into the hidden phrase to learn an interesting fact about NOAA's environmental satellites. Be careful not to get caught in dead ends. The first two letters have been done for you.



NOA \_\_\_\_ o \_\_\_\_ e \_\_\_\_ a \_\_\_\_ e \_\_\_\_ t \_\_\_\_ o \_\_\_\_ y \_\_\_\_ e \_\_\_\_

o \_\_\_\_ s \_\_\_\_ t \_\_\_\_ l \_\_\_\_ i \_\_\_\_ e \_\_\_\_ y \_\_\_\_ t \_\_\_\_ m \_\_\_\_ f \_\_\_\_ r

\_\_\_\_ h \_\_\_\_ U \_\_\_\_ i \_\_\_\_ e \_\_\_\_ S \_\_\_\_ a \_\_\_\_ e \_\_\_\_ --

g \_\_\_\_ o \_\_\_\_ t \_\_\_\_ t \_\_\_\_ o \_\_\_\_ a \_\_\_\_ y \_\_\_\_ n \_\_\_\_ p \_\_\_\_ l \_\_\_\_ r -

\_\_\_\_ r \_\_\_\_ i \_\_\_\_ i \_\_\_\_ g \_\_\_\_ a \_\_\_\_ e \_\_\_\_ l \_\_\_\_ t \_\_\_\_ s.

## 5. Crossword Puzzle

Find the words listed below. Notice that the answers can be listed diagonally, backwards, forwards, horizontally, or vertically.

```

K C L A R K E S A T E L L I T E
I O K Y P L A N E T S U F F H N
A N E P O C S E L E T K L P E V
N I S Y U E P A D S R A T S R I
N C S U R F A C E T J E R J M R
E O N F L G C R T Y Z G D U A O
T L U F T A E H T R Y A A N L N
N O S E D N T Y T H R M D E J M
A Z X Y F N G E Y U D I U X R E
F G H Y T R A N S M I T T E R N
U C O M M U N I C A T I O N S T
P O I N T I N G C O N T R O L T
F E S A T A D D N A M M O C Y I
  
```

Command Data  
Insulates  
Antenna  
Satellite  
Transmitter

Communications  
Sun  
Image  
Telescope

Pointing Control  
Space  
Earth  
Stars

Thermal  
Environment  
Surface  
Planets



## 6. Solve the Puzzle

Solve the puzzles to figure out the answers to numbers 1 - 7. Then, use the missing word from each word puzzle to figure out the questions at the bottom of the page. The first one has been done as an example.

1.) Nathan - than + Station - sta + all - l = **National**

Example: Na**th**an - **th**an = Na + **Sta**tion - **sta** = Nation + All = Nation**al** - l = **National**

2.) Octopus - topus + Mean - m + pick - pk = \_\_\_\_\_

3.) Atlas - las + Most - t + Phase - ase + Cheer - che + Picnic - picn = \_\_\_\_\_

4.) Administer - ter + Train - in + Tradition - tradi = \_\_\_\_\_

5.) Geography - graphy + Station + Ordinary - ordin = \_\_\_\_\_

6.) Polaroid - oid + - + Labor - lab + Bitten - ten + Exploring - explor = \_\_\_\_\_

7.) Stale - tale + State - st + Mall - ma + ite + Sun - un = \_\_\_\_\_

What are the two types of environmental satellites?

\_\_\_\_\_ and \_\_\_\_\_  
5 6

\_\_\_\_\_  
7

Who administers these satellites?

**National** \_\_\_\_\_ and \_\_\_\_\_  
1 2 3

\_\_\_\_\_  
4

## 7. Word Figure

Solve the math equations to figure out the hidden word. The letters correspond with the solutions in the hidden problem. Some equations have multiple steps to follow. The first equation is given to you. (Hint: Always remember to follow the order of operations - Parentheses, Exponentiation, Multiplication, Division, Addition, Subtraction (P.E.M.D.A.S.)

$$A = 4/2 =$$

$$L = 200 - 100 =$$

$$V = 3 \times 3 =$$

$$S = 5 \times 4 =$$

$$T = 80 - 32 + 2 =$$

$$O = 50/2 =$$

$$R = 12 \times 12 =$$

$$E = 6 \times 6 =$$

$$I = 4 \times 3 - 6 + 2 =$$

$$M = 15 + 8 - 10 + 2 =$$

$$N = 24/2 =$$

36	12	9	8	144	25	12	15	36	12	50	<sup>A</sup> 2	100
20	2	50	36	100	100	8	50	36	20			



## 8. Web Sites & Notes

List some helpful web site addresses or jot down some notes about facts mentioned in this booklet. You can use this page as a reference in the future to revisit facts about satellites, weather and safety.

1) \_\_\_\_\_

\_\_\_\_\_

2) \_\_\_\_\_

\_\_\_\_\_

3) \_\_\_\_\_

\_\_\_\_\_

4) \_\_\_\_\_

\_\_\_\_\_

5) \_\_\_\_\_

\_\_\_\_\_

## **Educational Resources**

### **NOAA**

**[www.noaa.gov](http://www.noaa.gov)**

Find out everything you need to know about NOAA.

### **NOAA Education**

**[www.education.noaa.gov](http://www.education.noaa.gov)**

This site provides students, teachers, librarians, and the public access to educational activities, publications, and booklets.

### **NOAA Education and Training**

**[www.epp.noaa.gov](http://www.epp.noaa.gov)**

This site provides information on various educational opportunities through the Educational Partnership Program at NOAA.

### **NOAA Satellite and Information Service**

**[www.nesdis.noaa.gov/EducationOutreach.html](http://www.nesdis.noaa.gov/EducationOutreach.html)**

This site provides educational material and resources related to satellite, weather, and climate.

### **NOAA Library**

**[www.lib.noaa.gov](http://www.lib.noaa.gov)**

The library provides scientific, technical, and legislative information to users such as NOAA staff, general public, academia, industry, and other government agencies.

### **NOAA Education Outreach Center**

**[www.education.noaa.gov](http://www.education.noaa.gov)**

A limited supply of free printed educational materials are available for distribution. Requests for educational materials should be addressed to:

NOAA Outreach Program Specialist

NOAA Office of Education

1305 East West Highway, SSMC4, Room 1W514

Silver Spring, MD 20910

Phone: (301) 713-1208

E-mail: [NOAA-OUTREACH@noaa.gov](mailto:NOAA-OUTREACH@noaa.gov)

# Answers

## Page 3 - Activity 1

Rain Coat, Rain Hat, Umbrella, Rubber Boots

## Page 4 - Activity 4

1. roads, 2. flash flood, 3. ground, 4. streams,  
5. car, 6. bridges

## Page 10 - Activity 1

1. T, 2. F, 3. T, 4. T, 5. T, 6. F, 7. F, 8. T, 9. T, 10. F

## Page 10 - Activity 2

Column, Safety, Windy, Funnel, Destructive, Gray,  
Twister, Cloudy, Fast

## Page 15 - Activity 1

v,i,k,o,p,d,w,t,x,l,h,c,b,r,m,e,g,a,n,f,q,s,j,u

## Page 16 - Activity 2

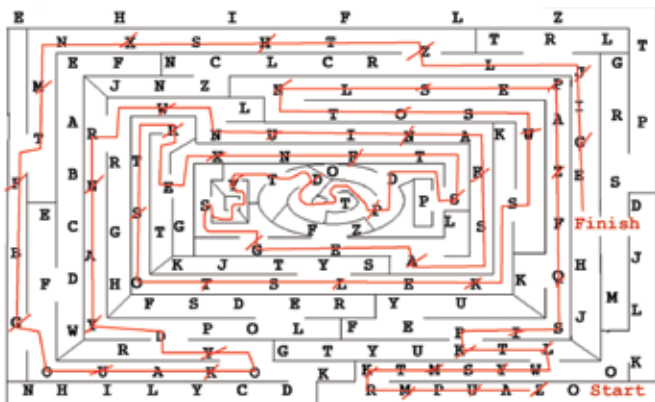
P W G M E T E O R O L O G Y T  
E R A N D S C L B H E T E F H  
B H E L I I U L L R E N E O E  
A C O C R N I I U I A A C R R  
R C Y R I Z T T S C H U T E M  
O D U C Z P A H I L M C S C O  
M S U A L R I R G U E L T A M  
E W R O E O R T L I I C R S E  
T D E P L U N U A A L R A T T  
E A M D H C S E H T N D T R E  
R E D R I Z Z L E A I R U A R  
T T I E H N E R H A F O S I R  
S N O W H U M I D I T Y N N A  
I P R E S S U R E E E R G E D  
N R E D N U H T O D A N R O T

Answer at bottom: Weather And Rain

## Page 17 - Activity 3

Across: Water, Drops, Puffy, Electrical,  
Scientist, Gas, Eyes, Down: Boundary, Sound, Twister,  
Foggy, World, Predict, Rain, Colors, Flash, Hairlike

## Page 18 - Activity 4



NOAA operates two types of satellite systems for the United States - geostationary and polar-orbiting satellites.

## Page 19 - Activity 5

K C L A R K E S A T E L L I T E  
I O K Y P L A N E T S U F F H N  
A N E P O C S E L E T K L P E V  
N I S Y U E P A D S R A T S R I  
N C S U R F A C E T J E R J M R  
E O N F L G C R T Y Z G D U A O  
T L U F T A E H T R Y A A N L N  
N O S E D N T Y T H R M D E J M  
A Z X Y F N G E Y U D I U X R E  
F G H Y T R A N S M I T T E R N  
U C O M M U N I C A T I O N S T  
P O I N T I N G C O N T R O L T  
F E S A T A D D N A M M O C Y I

## Page 20 - Activity 6

1.) National; Nathan - **than** = Na + **Station** - **sta** = Na-  
tion + All = Nation**all** - **l** = National

2.) Oceanic; Octopus - **topus** + Mean - **m** + pick - **pk**  
= Oceanic

3.) Atmospheric; Atlas - **las** + Most - **t** + Phase - **ase** +  
Cheer - **che** + Picnic - **picn** = Atmospheric

4.) Administration; Administer - **ter** + Train - **in** +  
Tradition - **tradi** = Administration

5.) Geostationary; Geography - **graphy** + Station +  
Ordinary - **ordin** = Geostationary

6.) Polar-orbiting; Polaroid - **oid** + - + Labor - **lab** +  
Bitten - **ten** + Exploring - **explor** = Polar-orbiting

7.) Satellites; Stale - **tale** + State - **st** + Mall - **ma** + ite  
+ Sun - **un** = Satellites

Answers at bottom:

What are the two types of Environmental Satellites?  
**Geostationary** and **Polar-Orbiting Satellites**

Who administers these satellites?

**National Oceanic** and **Atmospheric Administration**

## Page 21 - Activity 7

$4/2 = 2$	$6 \times 6 = 36$
$5 \times 4 = 20$	$24/2 = 12$
$12 \times 12 = 144$	$3 \times 3 = 9$
$15 + 8 - 10 + 2 = 5$	$50/2 = 25$
$200 - 100 = 100$	$4 \times 3 - 6 + 2 = 8$
$80 - 32 + 2 = 50$	

Answer at bottom: Environmental Satellites



U.S. Department of Commerce  
National Oceanic and Atmospheric Administration  
NOAA Satellite and Information Service  
Education & Outreach  
Silver Spring Metro Center, Building #1  
1335 East-West Highway  
Silver Spring, Maryland 20910-3282  
(301)-713-2087 ext. 112

[www.nesdis.noaa.gov](http://www.nesdis.noaa.gov)

